

CLAIMS

5 the channel, the method comprising:

for each data stream:

a) receiving a data packet at an input of a data stream;

b) segmenting the data packet into segments;

10 indicating an estimated arrival time for the packet at the multiplexer;

d) transmitting the time label to the multiplexer at a first signal from the multiplexer;

e) transmitting the segments comprising the data packet to the channel at a second signal from the multiplexer; and

15 f) storing the time label as a previously transmitted stream time label;
for the multiplexer:

aa) signalling a data stream to transmit a time label by sending the first signal;

bb) receiving a received time label from a data stream, the received time label being associated with the data stream transmitting the received time label;

20 cc) storing the received time label in a group of received time labels the group of
time labels containing received time labels from other data streams;

dd) sorting the group of received time labels to determine a transmitting time label with an earliest estimated arrival time of the group;

25 ee) sending a second signal to the data stream associated with the transmitting time label to transmit the segments comprising a transmitting data packet to the channel, said transmitting data packet being a data packet assigned with the transmitting time label;

ff) storing the transmitting time label as a previously transmitted channel time label; and

30 gg) removing the transmitting time label from the group after the segments comprising the transmitting data packet have been transmitted.

2) Method as claimed in claim 1 wherein step c) further includes:

c1) storing the data packet in a FIFO (first in, first out) stream queue, the stream queue having a front end and containing previously received data packets, the stream

c2) calculating the estimated arrival time for the data packet at the destination of the data packet

- if the group is not empty, the later of:

c32) the time label of the packet currently transmitted; if the group is

c3a) the estimated arrival time of the data packet and

3) Method as claimed in claim 2 wherein step c2) further includes calculating estimated arrival time for the data packet at the multiplexer of the data packet by relatively adding for every segment produced from the data packet a determined minimum inter-segment time to a segment time counter, the segment counter initially having a value equal to the estimated arrival time for the previous data packet, the previous data packet being

- a previously received data packet and

- received by the data stream immediately preceding the data packet.

5) Method as claimed in claim 1 wherein step cc) includes storing the group in a priority queue.

7) Method as claimed in claim 6 wherein the priority queue is stored in an array.

9) Method as claimed in claim 8 wherein, if a time gap between the transmitting time label and the previously transmitted stream time label of a lapsed data stream is greater than a predetermined value, a next data packet from that lapsed data stream is assigned a time label equal to the transmitting time label in use when the next data packet is segmented.

receiving means for receiving the data packets from the plurality of data
5 streams;

processor means for:

10 ... a size of the segments; and
 ... a size of the packets;

15 c) comparing time labels of data packets to determine a transmitting time
label having an "earliest estimated arrival time" of the data packets;

transmission means for transmitting to the single channel the segments arising the data packet assigned the transmitting time label having the earliest stated arrival time;

time label buffer memory means for storing time labels assigned to the data packets; and

the processor means is coupled to:

the transmission means;

the time label buffer memory means;

the buffering memory means is coupled between the receive means and the gating means.

a) for each data stream:

5 aa) serially arranging the data packets into a stream queue having a front;
 ab) assigning a time label to each data packet, said time label containing
data indicating an estimated arrival time for said data packet at a segmentation
and multiplexing device;

10 ac) sending the time label of a front data packet to a priority queue
containing other time labels of other front data packets, a front data packet being
the data packet at the front of a stream queue;

 ad) associating the time label of the front data packet with the data stream
which contains the front data packet assigned to the said time label;

15 b) determining which time label in the priority queue has an earliest estimated
arrival time;

 c) giving transmission priority to the data stream associated with the time label
having the earliest estimated arrival time, said transmission priority being for
transmitting the front data packet assigned to the time label having the earliest
estimated arrival time.

20 12) Device for multiplexing a plurality of data streams onto a single channel,
each of said data streams containing a plurality of data packets being transmitted to a
destination, the device including:

 receiving means for :

25 a) receiving and segmenting the data packets into segments, said data
packets being received from the plurality of data streams;

 b) measuring:
 a size of the segments; and
 a size of the packets;

30 c) calculating and assigning a time label to each data packet, said time
label containing data indicating an estimated arrival time for each packet at the
device;

 segment buffer memory means for temporarily storing the segments;

 processor means for comparing time labels of data packets to determine a
transmitting time label having an earliest estimated arrival time of the data packets;

gating means for controlling the transmission of data packets from the segment
5 buffer memory means to the processing means;

wherein

10 the gating means is coupled between the processing means and

- the time label buffer memory means; and

the receiving means is coupled to the segment buffer memory means and the time label buffer memory means.